

Pasteurized Waste Milk Management Considerations

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Feeding pasteurized waste milk can provide adequate nutrition for young calves. However, it must be handled and pasteurized correctly to minimize the risk of spreading disease organisms from cows to calves.

What is pasteurization?

Pasteurization is the process of heating liquids for the purpose of destroying harmful organisms. It is important to remember that pasteurization is not sterilization; rather it reduces the bacteria load so that they are unlikely to cause disease.

Mycobacterium avium subsp. paratuberculosis, *Salmonella spp*, *Mycoplasma spp*, *Listeria monocytogenes*, *Camphylobacter spp*, *Mycobacterium bovis*, *Staphylococcus aureus*, *E. Coli*, *Pasteurella spp*, *Bovine Virus Diarrhea (BVD)*, and *Bovine Leukosis Virus BLV* are all pathogens that can be eliminated if properly pasteurized using a Batch/Vat or HTST (high temp, short time) pasteurizer.

Steps to Pasteurizing Waste Milk:

1. Collect waste milk. Do not save excessively bloody or mastitic milk.
2. Do not allow milk to sit at room temperature before feeding. Waste milk should be cooled to 40 °F or pasteurized immediately.
3. Sanitize pasteurization equipment using sanitizer approved for milk processing equipment. Follow label instructions for concentration and contact time.
4. *Batch or vat pasteurization:* Heat waste milk to at least 145 °F and hold it for at least 30 minutes.

High temperature, short time pasteurization: Heat waste milk to at least 161 °F and hold it for at least 15 seconds.

5. Feed warm pasteurized milk or rapidly cool milk to 40 °F for storage. If milk is not fed soon after pasteurization, it must be kept in cold storage until the next feeding to prevent growth of micro-organisms.
6. Clean and sanitize pasteurization equipment. Provide adequate water temperature for cleaning (160 to 170 °F). Temperatures over 172 °F may result in residues on surfaces which are difficult to clean.

Heat-treating Colostrum

First-milking colostrum is an important source of nutrients and of passively absorbed maternal antibodies, critical to protect the newborn calf against infectious disease in the first few weeks and months of life.

However, colostrum can also represent one of the earliest potential exposures of dairy calves to infectious pathogens. Bacterial contamination of colostrum is a concern because pathogenic bacteria can act directly to cause diseases such as scours or septicemia. Bacteria may interfere with passive absorption of colostrum antibodies into the circulation, reducing passive transfer of immunity in the calf. Some colostrum infections, like *BLV* and *Mycobacterium avium paratuberculosis* may not become apparent until cattle are adults.

Using conventional methods and temperatures to pasteurize colostrum can cause colostrum to thicken or congeal and lower serum IgG concentrations in calves that were fed pasteurized colostrum.

To avoid these issues, it is recommended to use a lower-temperature, longer-time approach. Heat-treating colostrum at 140 °F for 60 minutes in a commercial batch pasteurizer should maintain IgG levels while eliminating important pathogens.

Recommendations to Heat-treat Colostrum:

1. Use only high quality colostrum measured with a colostrometer or refractometer.
2. Collect and store colostrum under strict sanitary conditions.
3. Pasteurize in small batches (15 gal)
4. Pasteurize colostrum at 140 °F for 60 minutes.
5. Feed 4 liters of colostrum as soon as possible after birth.
6. Feed 2 additional liters within 12 hours after the first feeding (optional).

Routine Management of Pasteurizer

In order to be most successful, producers must pay careful attention to the pasteurized milk feeding program.

1. **Periodic culture of milk samples-**
 - a. Pre-pasteurized: <1,000,000 CFU/ml total plate count
 - b. Post-pasteurized: <20,000 CFU/ml total plate count
2. **Culture samples during feeding-**
 - a. Sample after the last calf is fed
 - b. Evaluate sanitation of bottles, buckets, or tanks used to hold or transfer milk to calves.
3. **Take monthly samples of fat, protein, lactose, and total solids.**
 - a. Total solids >12%
 - b. Fat percentage >3.5%
 - c. Protein percentage ≥ 3.0%

Routinely Monitor Health Records

Recording disease incidence and treatment rate will help monitor the health status of calves. Frequent treatment and/or mortality rates should send a red flag to evaluate calf-feeding program.

Measuring passive transfer rates in calves is an important management tool to determine quality of colostrum program. More than 90% of calves tested between 24 hours and 7 days of age should have a serum total protein of 5.0 grams per deciliter or greater.

Summary

Feeding pasteurized waste milk represents one way to gain important economic and nutritional efficiencies for calf growers but can be a major risk factor for introducing infectious diseases to calves if handled improperly.

Pasteurization requires many steps to be followed carefully and properly. This includes careful handling of pre and post pasteurized milk to prevent bacterial contamination or proliferation, monitoring of pasteurizer function, and routine cleaning and sanitation of pasteurization equipment, as well as milk collection, storage, transfer, and feeding equipment.

Producers should evaluate their colostrum, nutritional, health, and employee management to develop a well-managed calf feeding program.

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<http://nahms.aphis.usda.gov/dairy>

A BAMN Publication Managing a Pasteurizer System for Feeding Milk to Calves

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